



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,193	08/22/2005	Caiguo Gong	2002B093	5600

23455 7590 06/06/2008
EXXONMOBIL CHEMICAL COMPANY
5200 BAYWAY DRIVE
P.O. BOX 2149
BAYTOWN, TX 77522-2149

EXAMINER

WYROZEDSKI LEE, KATARZYNA I

ART UNIT	PAPER NUMBER
----------	--------------

1796

MAIL DATE	DELIVERY MODE
-----------	---------------

06/06/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/518,193

Applicant(s)

GONG ET AL.

Examiner

Katarzyna Wyrozebski

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,6,8,10,11,13,16,19,20,22,23,27,29,30,32,34-37,39,42 and 45 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 8/29/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

Continuation of Disposition of Claims: Claims pending in the application are 1-3, 5, 6, 8, 10, 11, 13, 16, 19, 20, 22, 23, 27, 29, 30, 32, 34-37, 39, 42 and 45.

Submitted by the applicant's preliminary amendment is acknowledged. Claims 4, 7, 9, 12, 14, 15, 17, 18, 21, 24-26, 28, 31, 33, 40, 41, 43, 44, 46-71 are cancelled. Limitations of cancelled claims are incorporated into claims already pending.

Claim Objections

1. Claims 2 and 30 are objected to because of the following informalities: The applicants in their claims recite term "substituted" however, without specific definition as to the meaning of this term. Specification only provides examples. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1796

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 2, 5, 8, 10, 11, 13, 16, 19, 22, 23, 27, 29, 30, 34-37, 39, 42, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over NOMURA (EP 472,344) and CHINO (US 6,372,855).

The prior art of NOMURA discloses a composition comprising clay nanocomposite and modified alpha-olefin.

Composition of NOMURA has following properties: impact resistance, heat resistance among others.

Olefin elastomer is modified with at least one carboxylic acid group. The polymer is ethylene/alphaolefin or copolymer with styrene monomers. Alpha olefins are compounds comprising 3-20 carbon atoms. Modifying monomers include maleic acid, maleic anhydride, itaconic anhydride, itaconic acid, citraconic anhydride and the like (page 4). Initiators for grafting are peroxides and include peroxy acetates, dicumyl peroxide, peroxybenzates and the like. These are species of hydroperoxides and peroxyesters.

According to page 6 of NOMURA up to 20 wt % of elastomer is modified with polar groups.

Clay nanocomposite is formed by dispersing up to 10 wt % of clay into polyamide. Clay mineral is a smectite type claim comprising platelets (page 5), wherein specific clays include montmorillonite, saponite, beidelite and the like (page 6). According to NOMURA the clay is pretreated with swelling agent such as ammonium compound to increase basal spacing between clay platelets. Incorporation of polyamide results in exfoliation of lamellar clay into single platelets.

Method as taught on page 9 of NOMURA discloses mixing of composition comprising grafted elastomer and exfoliated clay and melt process it to form various molded articles. Additives such as inorganic fillers are disclosed on page 10.

Although the prior art of NOMURA does disclose basic composition required by the present claims it does not specify how exactly the grafting monomer is grafted onto elastomer. As per formulae disclosed in claim 1 of the instant invention, grafting monomer is linked with elastomer only in one position.

With respect to the above difference, please see art of CHINO and formulae (I) and (II) in col. 4, formulae (IV) in col. 5 as examples of how such monomers are grafted onto elastomer. The prior art of CHINO further teaches that such grafting can occur with other alphaolefin based elastomers such as isobutylene and paramethyle-styrene. CHINO also discloses use of secondary rubbers such as SBR to obtained desired property depending on the intended use of the composition.

The prior art of CHINO as applied against present claims utilizes olefin elastomers functionalized with polar groups such as anhydrides. The effects of how these groups attached to the polymer as disclosed in CHINO should be similar to the modification of NOMURA, especially since resulting polymer will still contain the same functional polar group.

In the light of the above disclosure, it would have been obvious to one having ordinary skill in the art at the time of the instant invention to either utilize the polymers of CHINO in teachings of NOMURA or modify polymer of NOMURA in the same way as disclosed in CHINO and thereby obtain the claimed invention. Such modification would still provide alphaolefin grafted with polar group suitable for teachings of NOMURA.

6. Claims 1, 2, 5, 8, 10, 11, 13, 16, 19, 20, 22, 23, 29, 30, 34, 35, 37, 39, 42, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over CHINO (US 6,372,855) and AJBANI (US 6,759,464).

The prior art of CHINO discloses composition for making tires. One example is given to tire treads.

Applicant's attention is drawn to formulas (I), (II) and (IV) of the disclosure of CHINO, which are the same types of formulas disclosed by instant claims (col. 4-5). The monomers are grafted onto a rubber with use of free radical generator in stable process and in presence of oxygen.

Elastomer to be grafted is described in col. 5 is polyisobutylene rubber, comprising at least one isobutylene monomer as well as para methyl styrene and its halogenated form.

One of the rubbers utilized in the teachings of CHINO is copolymer of isobutylene and p-methyl styrene with tradename EXXPRO 90-10. Bound styrene content in this particular rubber is 23 %. Fillers are those well known in the tire industry and include silica and carbon black as described in col. 7-8. Coupling agent is utilized in amount of 0.5-30 % by weight of silica.

Additional rubbers include SBR, NR, IS, NBR, IRI and the like. Such rubbers can be utilized singly or in mixture of two or more (col. 7).

The composition further comprises additional rubbers that are diene rubbers, 15-100 parts by weight of filler, wherein the graft rubber comprises up to 30 wt % of the composition. (col. 5).

In the process of CHINO rubbers and fillers are mixed melt-processed together to produce tire composition.

ADJABANI discloses tire composition for parts such as treat, sidewall and innerliner. The composition comprises elastomers and intercalated and exfoliated clay.

Clay is disclosed in col. 3-4 of the prior art and it teaches use of smectite type clays that can be pre-treated with cationic compound (In case of ADJABANI – ammonium compounds)

such that basal spacing between clay platelets increases and eventually exfoliation occurs. The amount of clay is disclosed in examples of ADJABANI and all are within bounds of the instant invention.

Rubber of ADJABANI is a mixture of two different rubbers, one of which is functionalized with polar monomer. Examples of polar monomers include anhydride and carboxylic acids (col. 10). The functionalized elastomer comprises up to 40 % of such polar groups (col. 9) in presence of free radical initiator. According to teachings of ADJABANI, the rubber is prepared using process disclosed in U.S. Patent 5,300,569, which is incorporated here by reference. This patent teaches that grafting free radical initiator is peroxide, since they result in elastomers having good tensile strength.

Additional rubbers are also taught and can be used as one or mixture of two or more. The additives and curatives for tires are listed in col. 14.

Method of ADJABANI discloses mixing rubber with grafting monomer, radical initiator and clay to obtain clay nanocomposite in a dispersion. Obtained nanocomposite is melt blended with other rubbers and additives.

The prior art of ADJABANI teaches that the exfoliated clay is utilized as reinforcement for tire compositions (col. 4). One of ordinary skill in the art also knows (it is considered a common knowledge) that the exfoliated clays also improve barrier property of the polymeric compositions, especially suitable for tire innerliners.

In the light of the above disclosure, it would have been obvious to one having ordinary skill in the art at the time of the instant invention to add clay of ADJABANI into the composition of CHINO and thereby obtain the claimed invention. ADJABANI showed that exfoliated clay is

an excellent reinforcing additive in tire industry that can be utilized with silica and/or carbon black. It is therefore functional equivalent.

7. Claims 3, 6, 27, 32, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over NOMURA (EP 472,344) and CHINO (US 6,372,855) or CHINO (US 6,372,855) and AJBANI (US 6,759,464), and further in view of CHUNG (US 6,015,862).

The discussion of the disclosure of NOMURA and CHINO, or that of CHINO and ADJABANI from paragraph 5 or 6 of this office action is incorporated here by reference.

The difference between the present invention and teachings of NOMURA and CHINO or CHINO and ADJABANI is recitation of functionalizing styrene monomer of the isoolefin.

With respect to the above difference the prior art of CHUNG discloses olefin rubber modified with polar group, which modification increases adhesion between two polymers.

The modifying group is depicted in col. 10 of the prior art of CHUNG and in this case, the styrene content is low due to use of Ziegler Natta catalyst to produce the olefin polymer. Such polymerization result in polymers having bound styrene content as low as 1.67 % (col. 15) to 5.63 % (example 14). Grafting is achieved with use of peroxides (examples) such as dicumyl peroxide (peroxide ester).

Functionalized olefin polymers of CHUNG are disclosed to be more compatible with other polymeric compounds and its adhesion is also improved, which are also properties disclosed in the teachings of CHINO and ADJABANI.

In the light of the above disclosure it would have been obvious to one having ordinary skill in the art at the time of the instant invention to utilize the polymer of CHUNG in the

teachings of NOMURA and CHINO or CHINO and ADJBANI and thereby obtain the claimed invention. Such modification would provide a composition that would retain the adhesion properties of polymers disclosed in CHINO and ADJBANI.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katarzyna Wyrozebski whose telephone number is (571) 272-1127. The examiner can normally be reached on Mon-Thurs 8:30 AM-2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katarzyna Wyrozebski/
Primary Examiner, Art Unit 1796
June 5, 2008